looked upon as a standard in this class of literature. KONOPS

HOW A FALLING CAT TURNS OVER IN THE AIR

TO THE EDITOR OF SCIENCE: In a lecture on the gyrostat before the Washington Society of Engineers, I gave a valid explanation of how a cat is able to light on his feet when he is dropped back downwards. After the lecture Professor J. F. Hayford was kind enough to call my attention to what is no doubt the actual character of this cat performance, and I give a statement of it herewith for the readers of SCIENCE. However, I prefer the idea I had formerly of the cat performance, because I am able to do it myself, not indeed while falling through the air but while standing on a pivoted stool. It is my impression that the idea I had formerly is the generally accepted idea of the cat performance, but it is difficult to explain, although easy to perform.

The curved figure in the accompanying sketch is a conventionalized cat which is let fall back downwards, and the question is how can a cat (not so highly conventionalized) turn over and light on its feet.

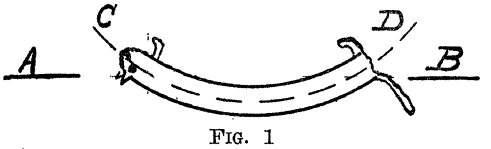


FIG. 1

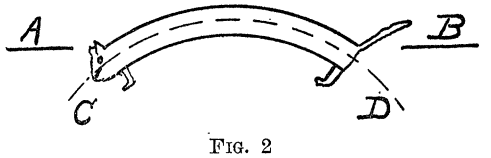


FIG. 2

There are two simple types of motion of the cat's body which give spin momentum around the axis AB, namely, (a) a rotation around AB as an axis of the cat's body as a rigid structure, and (b) a sort of squirming motion in which each part of the cat's body rotates about the curved line CD.

The amount of spin momentum due to a spin velocity a of the first kind is Ka, and the amount of spin momentum due to a squirming velocity b of the second kind is kb; and the factor k[1] is always less than the factor K when the cat's body is curved.

Now suppose the falling cat to exert the muscular action necessary to produce and maintain a squirming velocity b; then the cat's body will simultaneously be set spinning in the first mode at spin velocity a such that

$$Ka + kb = 0$$

or

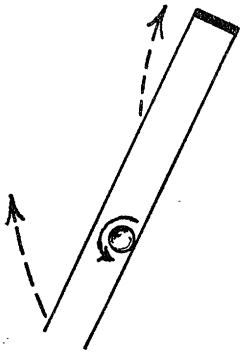
$$b = -(K/k)a,$$

because no spin momentum can be produced by forces inside the cat. Therefore a and b are opposite in sign and b is greater than a. Suppose, for example that b is twice as great as a; then while the cat squirms one complete revolution ($bt = 360°$) his bent form will rotate backwards through half a revolution ($at = 180°$), and the cat will be in the position shown in sketch No. 2, because each part of his body will have rotated through the angle $360° - 180°$ which is $180°$.

W. S. FRANKLIN

HOW TO THROW A CURVED BALL

TO THE EDITOR OF SCIENCE: I have tried a great variety of devices for throwing a curved ball for class-room demonstration, but with only moderate success, and I have tried in vain the method suggested by Professor J. J.



Thomson for causing a rubber balloon to travel in a sharply curved path. A year ago, Professor J. H. Wily suggested a method which is extremely satisfactory, as follows:

[1] This factor is not a moment of inertia in the usual sense of that term; but it is expressible in terms of the same unit.